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# Title: Denton Sputter Unit

**Semiconductor & Microsystems**
**Fabrication Laboratory** **Revision**: **C** **Rev Date: 2/2/21**

Approved by:

_____ / / _____ / /
Process Engineer Equipment Engineer

## 1 SCOPE

The purpose of this document is to detail the use of the Denton Sputter Unit. All users are expected to have read and understood this document. It is not a substitute for in-person training on the system and is not sufficient to qualify a user on the system. Failure to follow guidelines in this document may result in loss of privileges.

## 2 REFERENCE DOCUMENTS

- Appropriate Tool Manuals
- SDS for Argon gas, isopropyl alcohol and carbon paint

## 3 DEFINITIONS

n/a

## 4 TOOLS AND MATERIALS

### 4.1 General Description

4.1.1 This sputter unit is used for depositing a layer of gold on SEM samples. It also has a sample etch capability for cleaning samples prior to gold deposition.

## 5 SAFETY PRECAUTIONS

### 5.1 Hazard to the Operator

5.1.1 This system uses compressed argon gas. Please read and understand the SDS before using.
5.1.2 This unit has hazardous voltages inside. Do not operate with the covers off.

### 5.2 Hazards to the Tool

5.2.1 Excessive deposition times. Sputter runs should not last for more than 3 minutes.

# 6 INSTRUCTIONS

## 6.1 Initial State Check

6.1.0 Open **Argon bottle Main Valve** located on right rear of table by turning counterclockwise.
6.1.1 On the back of the unit verify that the gas regulator pressure is set to 5 psi of argon.
6.1.2 If the bell jar or the vacuum seal is dirty, clean with an ALPHA wipe lightly dampened with IPA.
6.1.3 If the samples have been mounted with carbon paint, make sure it is completely dry before gold coating so that the sample does not fall off the stub.

## 6.2 Resetting the System

6.2.1 The system may be reset by cycling the red **Main Power** on the right side of tool.

## 6.3 Sputter Procedure

6.3.1 When the red **Main Power** switch on the right side is off, the system will be vented and ready to open.
6.3.2 Open the lid on the jar and place the sample on the pedestal.
6.3.3 Make sure that the glass cylinder is positioned on the base plate and close the lid.
6.3.4 Turn on the red **Main Power** switch on the right side of the system and make sure that the lid is well seated as the pump starts. If the lid is not seated, the vacuum will not hold.
6.3.5 Allow the chamber to pump down to about **30 mTorr**.
6.3.6 Press the **Sputter** button. The unit will click as the gas inlet valve opens. If the pressure rises too high, the gas may turn off and you will have to press the **Sputter** button again.
6.3.7 Allow the system to stabilize the pressure at about **50 mTorr**. Adjust the **Gas Flow Control Knob** on the front of the unit if necessary.
6.3.8 Press the **Manual Start** button and adjust the current to **40 mA**.
6.3.9 When the desired time has elapsed, press the **Manual Stop** button. (30 seconds should give about 100Å; depending on the sample more may be necessary).
2 Minutes will yield about 200 A of gold
6.3.10 Alternately you may set a time with the **Preset Time** switches and use the **Timed** start button.
6.3.11 When complete, turn off the red **Main Power** button on the side. The unit will automatically vent and may be opened after about 20 seconds.

## 6.4 Sample Etch Procedure (Optional)

6.4.1 When the red **Main Power** switch on the right side is off, the system will be vented and ready to open.
6.4.2 Open the lid on the jar and place the sample on the pedestal.
6.4.3 Make sure that the glass cylinder is positioned on the base plate and close the lid.
6.4.4 Turn on the red **Main Power** switch on the right side of the tool and make sure that the lid is well seated as the pump starts. If the lid is not seated, the vacuum will not hold.
6.4.5 Allow the chamber to pump down to about **30 mTorr**.
6.4.6 Press the **Etch** button. The unit will click as the gas inlet valve opens. If the pressure rises too high, the gas may turn off and you will have to press the **Etch** button again.
6.4.7 Allow the system to stabilize the pressure to between **125 and 150 mTorr**. Adjust the **Gas Flow Control Knob** on the front of the unit if necessary.
6.4.8 Press the **Manual Start** button and adjust the current to **5 mA**.
6.4.9 After **30 seconds** has elapsed, press the **Manual Stop** button.
6.4.10 Alternately you may set a time with the **Preset Time** switches and use the **Timed Start** button.
6.4.11 When complete, turn off the red **Main Power** button on the side of tool. The unit will automatically vent and may be opened after about 20 seconds.
6.4.12 Close the ARGON bottle Main Valve located on right side of table by turning clockwise.

### 6.5 Errors during Run

6.5.1 If the unit does not pump down, make sure that the vacuum seals are clean and that the lid and glass jar are well seated.
6.5.2 If no gold is deposited, make sure that the pressure and current are correct and that you are using the **Sputter** mode. Also check that the target in the lid has not worn through.

## 7 APPROPRIATE USES OF THE TOOL

**7.1 This tool is intended for depositing a thin layer of gold on SEM samples. Sputter runs should not last for more than 3 minutes.**

## REVISION RECORD

| Summary of Changes | Originator | Rev/Date |
|---|---|---|
| Original Issue | Sean O'Brien | A-08/27/04 |
| Updated gas bottle instructions. | Scott Blondell | B-11/14/08 |
| Minor Updates – per review by P. Meller | TJG | C – 2/2/21 |
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